

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 2

3. A method according to claim 1, wherein said oxidizing is performed in an oxidizing atmosphere.
4. A method according to claim 1, wherein said oxidizing is performed in an oxidizing atmosphere containing water vapor.
5. A method according to claim 1, wherein said temperature is in a range of 500 to 650°C.
6. A method according to claim 1, wherein said semiconductor film has a thickness of 100 to 1,000 Å.
7. A method according to claim 1, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.
8. A method according to claim 1, wherein said semiconductor device comprises an active matrix type display device.
9. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:
forming a semiconductor film comprising silicon on an insulating surface;
crystallizing said semiconductor film; and
oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres and at a temperature of 500 to 650°C.
11. A method according to claim 9, wherein said oxidizing is performed in an oxidizing atmosphere.
12. A method according to claim 9, wherein said oxidizing is performed in an oxidizing atmosphere containing water vapor.
13. A method according to claim 9, wherein said oxidizing step is a pyrogenic oxidation process.
14. A method according to claim 9, wherein said semiconductor film has a thickness

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 3

of 100 to 1,000 Å.

15. A method according to claim 9, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

16. A method according to claim 9, wherein said semiconductor device comprises an active matrix type display device.

17. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon over an alkali-free glass substrate;

crystallizing said semiconductor film; and

oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres and at a temperature lower than a strain point of said glass substrate.

19. A method according to claim 17, wherein said oxidizing is performed in an oxidizing atmosphere.

20. A method according to claim 17, wherein said oxidizing is performed in an oxidizing atmosphere containing water vapor.

21. A method according to claim 17, wherein said temperature is in a range of 500 to 650 °C.

22. A method according to claim 17, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

23. A method according to claim 17, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

24. A method according to claim 17, wherein said semiconductor device comprises an active matrix type display device.

25. (Four Times Amended) A method of manufacturing a semiconductor device

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 4

having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon over a glass substrate;

crystallizing said semiconductor film;

forming an insulating film adjacent to said crystallized semiconductor film by plasma CVD; and

forming gate electrodes adjacent to said insulating film,

wherein said method further comprises a step of oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres and at a temperature lower than a strain point of said glass substrate.

27. A method according to claim 25, wherein said gate electrodes are formed over said active layers.

28. A method according to claim 25, wherein said oxidizing is performed in an oxidizing atmosphere containing water vapor.

29. A method according to claim 25, wherein said temperature is in a range of 500 to 650°C.

30. A method according to claim 25, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

31. A method according to claim 25, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

32. A method according to claim 25, wherein said semiconductor device comprises an active matrix type display device.

33. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon on an insulating surface;

crystallizing said semiconductor film;

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 5

forming an insulating film adjacent to said crystallized semiconductor film by plasma CVD; and

forming gate electrodes adjacent to said insulating film,

wherein said method further comprises a step of oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres and at a temperature of 500 to 650°C.

35. A method according to claim 33, wherein said gate electrodes are formed over said active layers.

36. A method according to claim 33, wherein said oxidizing is performed in an oxidizing atmosphere containing water vapor.

37. A method according to claim 33, wherein said oxidizing step is a pyrogenic oxidation process.

38. A method according to claim 33, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

39. A method according to claim 33, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

40. A method according to claim 33, wherein said semiconductor device comprises an active matrix type display device.

41. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon over an alkali-free glass substrate;

crystallizing said semiconductor film;

forming an insulating film adjacent to said crystallized semiconductor film by plasma CVD; and

forming gate electrodes adjacent to said insulating film,

wherein said method further comprises a step of oxidizing the crystallized semiconductor

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 6

film to be active layers of said thin film transistors in a pressurized atmosphere at a temperature lower than a strain point of said glass substrate.

43. A method according to claim 41, wherein said gate electrodes are formed over said active layers.

44. A method according to claim 41, wherein said oxidizing is performed in an oxidizing atmosphere containing water vapor.

45. A method according to claim 41, wherein said temperature is in a range of 500 to 650°C.

46. A method according to claim 41, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

47. A method according to claim 41, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

48. A method according to claim 41, wherein said semiconductor device comprises an active matrix type display device.

49. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon over a glass substrate;

crystallizing said semiconductor film; and

oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres; and [of a pressure of 1 to 15 atms.]

wherein said oxidizing the semiconductor film is performed in a temperature lower than a strain point of said glass substrate.

50. A method according to claim 49, wherein said strain point of said substrate is 750°C or less.

51. A method according to claim 49, wherein said oxidizing atmosphere contains

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 7

water vapor.

52. A method according to claim 49, wherein said temperature is in a range of 500 to 650°C.

53. A method according to claim 49, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

54. A method according to claim 49, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said heating step.

55. A method according to claim 49, wherein said semiconductor device comprises an active matrix type display device.

56. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon on an insulating surface;

crystallizing said semiconductor film; and

oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres; and [of a pressure of 1 to 15 atms]

wherein said oxidizing the semiconductor film is performed in a temperature of 500 to 650 °C.

57. A method according to claim 56, wherein said crystallizing step is performed at a temperature of 600°C.

58. A method according to claim 56, wherein said oxidizing atmosphere contains water vapor.

59. A method according to claim 56, wherein said oxidizing step is a pyrogenic oxidation process.

60. A method according to claim 56, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 8

61. A method according to claim 56, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said heating step.

62. A method according to claim 56, wherein said semiconductor device comprises an active matrix type display device.

63. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon over an alkali-free glass substrate;
crystallizing said semiconductor film; and

oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres; and [of a pressure of 1 to 15 atms], for electrically isolating said plurality of thin film transistors from one another,

wherein said oxidizing the semiconductor film is performed in a temperature lower than a strain point of said glass substrate.

64. A method according to claim 63, wherein said strain point of said substrate is 750°C or less.

65. A method according to claim 63, wherein said oxidizing atmosphere contains water vapor.

66. A method according to claim 63, wherein said temperature is in a range of 500 to 650°C.

67. A method according to claim 63, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

68. A method according to claim 63, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said heating step.

69. A method according to claim 63, wherein said semiconductor device comprises an

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 9

active matrix type display device.

70. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon over a glass substrate;

crystallizing said semiconductor film;

forming an insulating film adjacent to said crystallized semiconductor film; and

forming gate electrodes adjacent to said insulating film,

wherein said method further comprises a step of oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres; and [of a pressure of 1 to 15 atms, and]

wherein said oxidizing the semiconductor film is performed in a temperature lower than a strain point of said glass substrate.

71. A method according to claim 70, wherein said strain point of said substrate is 750°C or less.

72. A method according to claim 70, wherein said gate electrodes are formed over said active layers.

73. A method according to claim 70, wherein said oxidizing atmosphere contains water vapor.

74. A method according to claim 70, wherein said temperature is in a range of 500 to 650°C.

75. A method according to claim 70, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

76. A method according to claim 70, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

77. A method according to claim 70, wherein said semiconductor device comprises an active matrix type display device.

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 10

78. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon on an insulating surface;
crystallizing said semiconductor film;
forming an insulating film adjacent to said crystallized semiconductor film; and
forming gate electrodes adjacent to said insulating film,

wherein said method further comprises a step of oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres: [of at a pressure of 1 to 15 atms] and

wherein said oxidizing the semiconductor film is performed in a temperature of 500 to 650°C.

79. A method according to claim 78, wherein said crystallizing step is performed at a temperature of 600°C.

80. A method according to claim 78, wherein said gate electrodes are formed over said active layers.

81. A method according to claim 78, wherein said oxidizing atmosphere contains water vapor.

82. A method according to claim 78, wherein said oxidizing step is a pyrogenic oxidation process.

83. A method according to claim 78, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

84. A method according to claim 78, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

85. A method according to claim 78, wherein said semiconductor device comprises an active matrix type display device.

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 11

86. (Four Times Amended) A method of manufacturing a semiconductor device having a plurality of thin film transistors, comprising the steps of:

forming a semiconductor film comprising silicon over an alkali-free glass substrate;

crystallizing said semiconductor film;

forming an insulating film adjacent to said crystallized semiconductor film; and

forming gate electrodes adjacent to said insulating film,

wherein said method further comprises a step of oxidizing the crystallized semiconductor film to be active layers of said thin film transistors in a pressurized atmosphere at a pressure greater than one atmosphere upto 15 atmospheres; [of a pressure of 1 to 15 atms,] and

wherein said oxidizing the semiconductor film is performed in a temperature lower than a strain point of said glass substrate.

87. A method according to claim 86, wherein said strain point of said substrate is 750°C or less.

88. A method according to claim 86, wherein said gate electrodes are formed over said active layers.

89. A method according to claim 86, wherein said oxidizing atmosphere contains water vapor.

90. A method according to claim 86, wherein said temperature is in a range of 500 to 650°C.

91. A method according to claim 86, wherein said semiconductor film has a thickness of 100 to 1,000 Å.

92. A method according to claim 86, wherein at least one region of the semiconductor film is completely oxidized to a bottom surface of the semiconductor film during said oxidizing step.

93. A method according to claim 86, wherein said semiconductor device comprises an active matrix type display device.

94. A method according to claim 1, wherein said strain point of said substrate is

NVA216097.2

Docket No. 740756-1974
Application Serial No. 09/321,715
Art Unit 2822
Page 12

750°C or less.

95. A method according to claim 17, wherein said strain point of said substrate is 750°C or less.

96. A method according to claim 25, wherein said strain point of said substrate is 750°C or less.

97. A method according to claim 41, wherein said strain point of said substrate is 750°C or less.

98. A method according to claim 1, wherein said oxidizing step is a pyrogenic oxidation process.

99. A method according to claim 17, wherein said oxidizing step is a pyrogenic oxidation process.

100. A method according to claim 25, wherein said oxidizing step is a pyrogenic oxidation process.

101. A method according to claim 41, wherein said oxidizing step is a pyrogenic oxidation process.

102. A method according to claim 49, wherein said oxidizing step is a pyrogenic oxidation process.

103. A method according to claim 63, wherein said oxidizing step is a pyrogenic oxidation process.

104. A method according to claim 70, wherein said oxidizing step is a pyrogenic oxidation process.

105. A method according to claim 86, wherein said oxidizing step is a pyrogenic oxidation process.

REMARKS

The final Office Action of November 27, 2001, has been received and its contents carefully noted. Applicant respectfully submits that this response is timely filed. Claims 1-105

NVA216097.2